

The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* SATOSHI NAKAMURA

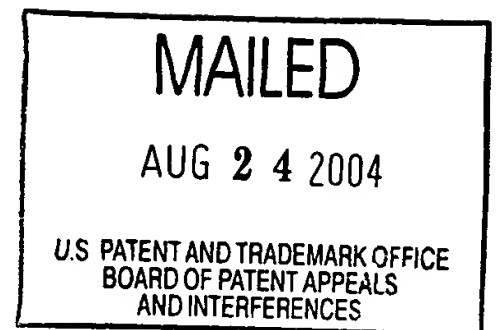
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Appeal No. 2004-1412  
Application 09/818,686

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ON BRIEF

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Before KIMLIN, WARREN and OWENS, *Administrative Patent Judges*.

WARREN, *Administrative Patent Judge*.

*Decision on Appeal*

This is an appeal under 35 U.S.C. § 134 from the decision of the examiner finally rejecting claims 1, 6, 7, 10 through 13 and 15 through 22. Claim 1 is illustrative of the claims on appeal:

1. A printed wiring board with an electronic component mounted on a circuit board in which the electronic component is provided with a heat radiating plate for conducting heat internally generated, comprising:

a first heat radiating pattern for conducting heat which is formed on a front surface of said electronic component, and connected to said heat radiating plate of the electronic component by soldering;

a second heat radiating pattern for conducting heat which is formed on a rear surface of said circuit board at a position being opposed to said electronic component, and

heat radiating means mounted on said second heat radiation pattern by soldering at a position being opposed to the electronic component, wherein

said heat radiating plate and said first radiating pattern have a same area whereas said second heat radiating pattern has a larger area than that of said first radiating pattern or said radiating plate.

The appealed claims, as represented by claim 1, are drawn to a printed wiring board with an electronic component mounted on a circuit board in which the electronic component is provided with a heat radiating plate soldered to a heat radiating pattern under said plate, and on the opposed side of the circuit board, a second heat radiating pattern to which is soldered heat radiating means, wherein the areas of the heat radiating plate and the heat radiating pattern to which the plate is soldered are equal and are smaller than the area of the heat radiating pattern on the opposed side of the circuit board.

The references relied on by the examiner are:

Christopher et al. (Christopher)	6,058,013	May 2, 2000
Kamioka <sup>1</sup> (published Japanese Patent Application)	04-113695	Apr. 15, 1992

We cite the following reference applied by the examiner in the final rejection:

Miyagi et al. (Miyagi)	5,506,755	Apr. 9, 1996
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In the answer, the examiner has rejected only appealed claims 1 and 15 under 35 U.S.C. § 103(a) as being unpatentable over Christopher in view of Kamioka (pages 3-4).

We consider the grounds of rejection set forth by the examiner in the final action mailed January 15, 2003, which have been briefed by appellant in the brief (see also reply brief, sentence bridging pages 3-4), for full consideration of the issues on appeal presented by the record in this application:<sup>2</sup>

claims 1, 10 through 12, 15 and 20 through 22 are rejected under 35 U.S.C. § 103(a) as being unpatentable Christopher in view of Kamioka (pages 2-3);<sup>3</sup>

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<sup>1</sup> We refer in our decision to the translation of Kamioka filed by appellant on March 19, 2003.

<sup>2</sup> See Manual of Patent Examining Procedure (MPEP) § 1208 (8th ed., Rev. 2, May 2004; 1200-16 – 1200-17) (“Grounds of rejection not argued in the examiner’s answer are usually treated as having been dropped, but may be considered by the Board if it desires to do so.”).

<sup>3</sup> We observe no difference in the statement of the ground of rejection applied to, *inter alia*, claims 1 and 15 over the combined teachings of Christopher and Kamioka in the final action

claims 6, 7, 13 and 19 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Christopher in view of Kamioka as applied to claims 1 and 15, and further in view of Miyagi (page 3); and

claims 16 through 18 are rejected under 35 U.S.C. § 103(a) as being unpatentable Christopher in view of Kamioka (pages 3-4).

Appellants state that “[i]n as far as presented herein, claims 1, 6, 7, 10-13 stand or fall together, and claims 15-22 stand or fall together” (brief, page 6). Thus, we decide this appeal based on appealed claims 1, 6, 15 and 16 as representative of the respective grounds of rejection and the grouping of claims as it pertains to a ground of rejection. 37 CFR § 1.192(c)(7) (2003).<sup>4</sup>

We reverse each of the three grounds of rejection set forth in the final action mailed January 15, 2003, and accordingly, the decision of the examiner. Under the provisions of 37 CFR § 1.196(b) (2003), we enter a new ground of rejection of appealed claims 1, 6, 7, 10 through 13 and 15 through 22 under 35 U.S.C. § 103 as being unpatentable over the combined teachings of Christopher and Miyagi. *See generally, In re Eynde*, 480 F.2d 1364, 1370-71, 178 USPQ 470, 474-75 (CCPA 1973); Manual of Patent Examining Procedure § 1213.02 (8th ed., Rev. 2, May 2004; 1200-32).

Rather than reiterate the respective positions advanced by the examiner and appellant, we refer to the examiner’s answer and to appellant’s brief and reply brief for a complete exposition thereof.

### *Opinion*

Considering first the grounds of rejection set forth in the final action, it is well settled that in order to establish a *prima facie* case of obviousness under § 103(a), the examiner must show

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mailed January 15, 2003, and the rejection of claims 1 and 15 over the same references stated in the answer.

<sup>4</sup> We point out here that under the rules pertaining to appellant’s brief, an appellant can group the claims with respect to each ground of rejection contested as specified, and if appellant does not do so, the Board will select the claim or claims on which it will decide that ground of rejection. *See* 37 CFR § 1.192(c)(6) (“concise statement of the issues presented for review”), § 1.192(c)(7) (“[f]or each ground of rejection that appellant contests . . . the Board shall select a single claim . . . unless a grouping of claims is presented by appellant pursuant to this paragraph), and § 1.192(c)(8) (“[t]he contentions of appellant with respect to each of the issues presented for review in paragraph (c)(6)” ) (emphasis supplied) (*see* brief, pages 3-5; answer, pages 2-3).

that some objective teaching, suggestion or motivation in the applied prior art taken as a whole and/or knowledge generally available to one of ordinary skill in this art would have led that person to the claimed invention as a whole, including each and every limitation of the claims arranged as required by the claims, without recourse to the teachings in appellant's disclosure. *See generally, In re Rouffet*, 149 F.3d 1350, 1358, 47 USPQ2d 1453, 1458 (Fed. Cir. 1998); *Pro-Mold and Tool Co. v. Great Lakes Plastics, Inc.*, 75 F.3d 1568, 1573, 37 USPQ2d 1626, 1629-30 (Fed. Cir. 1996); *In re Fritch*, 972 F.2d 1260, 1265-66, 23 USPQ2d 1780, 1783-84 (Fed. Cir. 1992); *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992); *In re Laskowski*, 871 F.2d 115, 10 USPQ2d 1397 (Fed. Cir. 1989); *In re Fine*, 837 F.2d 1071, 1074-76, 5 USPQ2d 1596, 1598-1600 (Fed. Cir. 1988). The requirement for objective factual underpinnings for a rejection under § 103(a) extends to the determination of whether the references can be combined. *See In re Lee*, 277 F.3d 1338, 1343, 61 USPQ2d 1430, 1433-34 (Fed. Cir. 2002), and cases cited therein.

Upon carefully considering the teachings of Kamioka as set forth in the translation and the examiner's position with respect thereto (answer, pages 3 and 4), on this record, we agree with appellant's argument that element **12** of Kamioka **Fig. 3**, which illustrates the *second* disclosed embodiment, is an electrical "insulating sheet" (brief, page 8), for indeed, the reference discloses "insulating sheet **12** of a silicon gum . . . sandwiched between the print board **5** and the heat generating component **8**, and between the print board **5** and the frame **3**," and "[t]hus, the electrical insulation between the heat generating component **8** and the frame **3** can be made perfect, and the presence of air is excluded to obtain better contact conditions" (page 6-7).

We contrast this disclosure with the disclosure with respect to Kamioka **Fig. 1**, which illustrates the *first* disclosed embodiment, and that does *not* have a numeral **12**. Instead, Kamioka discloses with respect to the first embodiment, that "heat generated from the heat generating component **8** is transferred to the metallic frame **3** through the coating **7** on the inner surface of a number of the throughholes **6** . . . [b]y filling the throughholes **6** with silicon grease, solder, or the like," and "if silicon grease or the like is applied between the print board **5** and the heat generating component **8**, and between the print board **5** and the frame **3**, there is no presence of an air layer, and thereby heat transferability is improved" (page 6).

We thus find that in the first illustrated embodiment of Kamioka, heat is dissipated by means of throughholes 6, with the use of, e.g., silicon grease between the components to improve heat transfer, while in the second illustrated embodiment, throughholes 6 are also used, but, according to the translation, in the second illustrated embodiment, silicon gum insulating sheets 12 are used between the components to electrically insulate the components.

We cannot agree with the examiner that one of ordinary skill in this art would have expected silicon gum insulating sheet 12 to dissipate heat on the basis of the disclosure that “elements 12 exclude presence of air” (answer, page 4). Indeed, Kamioka discloses that “the presence of air is excluded for better contact conditions” by using the sheet, which language taken with the first part of that sentence, “the electrical insulation between the heat generating component 8 and the frame 3 can be made perfect,” reasonably appears to suggest that electrical insulation is the reason the sheet is used. We note here appellant’s argument that the silicon gum insulation sheet 12 is “a rubber-made insulating sheet” (brief, page 8).

Thus, on this record, the examiner’s reliance on Kamioka is misplaced, and accordingly, because Christopher and Kamioka cannot be combined in the manner suggested by the examiner, we reverse the three grounds of rejection of all of the appealed claims under 35 U.S.C. § 103(a).

The decision of the examiner is reversed.

Pursuant to our authority under 37 CFR § 1.196(b) (2003), we enter the following new ground of rejection. Claims 1, 6, 7, 10 through 13 and 15 through 22 are rejected under 35 U.S.C. § 103 as being unpatentable over the combined teachings of Christopher and Miyagi. As an initial matter, we determine that when considered in light of the written description in the specification, including the drawings, as interpreted by one of ordinary skill in this art, *see, e.g., In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997); *In re Zletz*, 893 F.2d 319, 321-22, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989), the plain language of the appealed claims requires that the claimed printed wiring board, that has an electronic component with a heat radiating plate mounted on a circuit board, comprises at least a first heat radiating pattern connected by soldering to the heat radiating plate, and a second heat radiating pattern to which is soldered heat radiating means on the opposed side of the circuit board, wherein the areas of the second heat radiating pattern is larger, however small the difference, than the equal areas

of the plate and the first heat radiating pattern on the opposed side of the circuit board. The transitional term “comprising” opens the appealed claims to encompass printed wiring boards that have structure, such as additional heat radiating structure, in addition to that recited. *See, e.g., Vehicular Technologies Corp. v. Titan Wheel Int’l Inc.*, 212 F.3d 1377, 1383, 54 USPQ2d 1841, 1845 (Fed. Cir. 2000) *In re Baxter*, 656 F.2d 679, 686-87, 210 USPQ 795, 802-03 (CCPA 1981) (“As long as one of the monomers in the reaction is propylene, any other monomer may be present, because the term ‘comprises’ permits the *inclusion* of other steps, elements, or materials.”).

We find that one of ordinary skill in this art would have found in the disclosure of Christopher at col. 4, lines 22-38, and Christopher **FIG. 2**, that the thermally conductive path includes, in order, an unnumbered heat-radiating plate under each of the heat-generating components **119** and **225**; respective first heat radiating pattern solder layers **203** and **227**; respective metalized vias **205** and **229**; and the respective second heat radiating pattern solder layers **203** and **227**, to reach the heat radiating means having respective surfaces **113''** and **223** mounted on respective second heat radiating pattern solder layers **203** and **227**, as shown by Christopher **FIG. 2** (cols. 3-4).

We agree with the examiner that the printed wiring board shown in Christopher **FIG. 2** differs from the claimed printed wiring board encompassed by the appealed claims in that the second heat radiating pattern layers **121** and **121'** do not have a larger area than the first heat radiating pattern layers **203** and **227** (answer, page 3; *see also* brief, page 7). We also agree with appellant that “as shown in Fig. 2 of [Christopher], a heat radiating plate (not numbered) of [Christopher] is mounted under the electronic components 119 and 225 and has an area smaller than those of radiating patterns 203, 227, 121 and 121'” (reply brief, page 3).

However, we find in these respects that there are no dimensions disclosed by Christopher for the heat radiating plate, or for the first and second heat radiating pattern layers. We determine that, *prima facie*, one of ordinary skill in this art armed with the common knowledge that the area of a metal layer is a result effective variable with respect to heat radiation, as seen, for example, from the disclosure in Christopher with respect to metal plate **278** (col. 4, lines 61-64), would have found in the absence of a disclosure of dimensions for the elements of the

thermally conductive path in the reference, the reasonable suggestion that the workable or optimum range of the area of each of the metal elements of the thermally conductive path can be determined for the desired amount of heat radiation.

Accordingly, *prima facie*, one of ordinary skill in this art routinely following the teachings of Christopher would have reasonably arrived at the relative areas of the different metal elements of a printed wiring board as required by the appealed claims without recourse to appellant's specification. *See In re Boesch*, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980) (“[D]iscovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. [Citations omitted.]”); *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) (“[W]here general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.”). Therefore, the burden falls upon appellant to establish by effective argument or objective evidence that the claimed invention patentably distinguishes over the disclosure of Christopher. *See, e.g., In re Best*, 562 F.2d 1252, 1255-56, 195 USPQ 430, 433-34 (CCPA 1977) (“Where, as here, the claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes, the PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his claimed product. *See In re Ludtke*, [441 F.2d 660, 169 USPQ 563 (CCPA 1971)]. Whether the rejection is based on “inherency” under 35 USC 102, on “prima facie obviousness” under 35 USC 103, jointly or alternatively, the burden of proof is the same, and its fairness is evidenced by the PTO's inability to manufacture products or to obtain and compare prior art products. [Footnote and citation omitted.]”); *Aller, supra*; *see also In re Woodruff*, 919 F.2d 1575, 1577-78, 16 USPQ2d 1934, 1936-37 (Fed. Cir. 1990) (“The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims. [Citations omitted.] These cases have consistently held that in such a situation, the applicant must show that the particular range is *critical*, generally by showing that the claimed range achieves unexpected results relative to the prior art range. [Citations omitted.]”).

With respect to appealed claims 6, 7, 13 and 19, which require that the heat radiating means is made of metal, contacts the circuit board through a plated layer and has a plurality of fins, we find that Christopher would not have disclosed circuit boards having such heat radiating means. As found by the examiner in the final action mailed January 15, 2003 (page 3), Miyagi discloses such heat radiating means contacting a circuit board. Indeed, we find that Miyagi discloses that the heat radiating fins are provided on a surface opposite the wiring surface of the circuit board and connected thereto through thermal vias (e.g., cols. 2 and 4-6). Thus, we determine that one of ordinary skill in this art would have found in the combined teachings of Christopher and Miyagi the reasonable suggestion that the printed wiring board of Christopher which has thermal vias can be modified to include the heat radiating fins of Miyagi in the reasonable expectation of increased heat radiation. Indeed, Christopher would have suggested to one of ordinary skill that additional heat radiation means can be applied in teaching the additional use of metal plate 278 (col. 4, lines 61-64).

Accordingly, *prima facie*, one of ordinary skill in this art routinely following the combined teachings of Christopher and Miyagi would have reasonably arrived at printed wiring boards that have fin heat radiating means as required by appealed claims 6, 7, 13 and 19, without recourse to appellant's specification. *See In re Dow Chem. Co.*, 837 F.2d 469, 473, 5 USPQ2d 1529, 1531 (Fed. Cir. 1988) ("The consistent criterion for determination of obviousness is whether the prior art would have suggested to one of ordinary skill in the art that [the claimed process] should be carried out and would have a reasonable likelihood of success viewed in light of the prior art. [Citations omitted] Both the suggestion and the expectation of success must be founded in the prior art, not in the applicant's disclosure."); *In re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 881-82 (CCPA 1981) ("The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.").

With respect to appealed claims 16-18, which require that a plated layer to which the second heat radiating pattern is soldered contains tin and or nickel, we find that Christopher



would not have disclosed these two metals *per se* for use in the heat radiating elements of the thermally conductive paths taught in the reference. However, Christopher would have disclosed that thermally conductive metal used to plate surfaces can include “copper, but may be any other thermally conductive” material (col. 2, line 66, to col. 3, line 4). Miyagi discloses that suitable plating materials include copper and nickel (e.g., col. 5, lines 45-47). Christopher further teaches that solder forms heat radiating patterns and thus is thermally conductive (e.g., col. 4), and we take notice that it is well known that tin is a component of solder generally.

Accordingly, *prima facie*, one of ordinary skill in this art routinely following the combined teachings of Christopher and Miyagi would have reasonably arrived at printed wiring boards that have a plated layer as a heat radiating element of the thermally conductive path which contains nickel or tin as required by appealed claims 16 through 18 without recourse to appellant’s specification. *See Dow Chem., supra; Keller, supra.*

In view of the *prima facie* case of obviousness under § 103 established over the combined teachings of Christopher and Miyagi, the burden of going forward has shifted to appellant to submit argument and/or evidence in rebuttal. *See generally, In re Piasecki, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984).*

We have considered appellant’s arguments in the brief and reply brief with respect to whether they pertain to the new ground of rejection of all of the appealed claims which we explain above. We acknowledged above the difference that appellant identified between the claimed invention encompassed by the appealed claims and the disclosure of Christopher in addition to the difference identified by the examiner. However, appellant has not otherwise addressed the issues that we raise above with respect to the combined teachings of Christopher and Miyagi.

Accordingly, the burden of going forward with respect to this ground of rejection remains with appellant. *See Piasecki, supra.*

This decision contains a new ground of rejection pursuant to 37 CFR § 1.196(b)(2003). 37 CFR § 1.196(b) provides that, “A new ground of rejection shall not be considered final for purposes of judicial review.”

37 CFR § 1.196(b) also provides that the appellant, *WITHIN TWO MONTHS FROM THE DATE OF THE DECISION*, must exercise one of the following two options with respect to the

new ground of rejection to avoid termination of proceedings (§ 1.197(c)) as to the rejected claims:

- (1) Submit an appropriate amendment of the claims so rejected or a showing of facts relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the application will be remanded to the examiner. . . .
- (2) Request that the application be reheard under § 1.197(b) by the Board of Patent Appeals and Interferences upon the same record. . . .


No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

*Reversed*

*37 CFR § 1.196(b)*

Edward (Kamil)

EDWARD C. KIMLIN  
Administrative Patent Judge

  
CHARLES E. WARREN

CHARLES F. WARREN  
Administrative Patent Judge

# BOARD OF PATENT APPEALS AND INTERFERENCES

Terry J. O'Connell

TERRY J. OWENS  
Administrative Patent Judge

Appeal No. 2004-1412  
Application 09/818,686

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